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## HELICES OF LOWER CALIFORNIA AND SINALOA.

BY H. A. PILSBRY.

In my "Notes upon some Lower Californian Helices," Proc. Acad. Nat. Sci. Phila. 1913, descriptions and figures were given of the Helices of the west coast and coastal islands of the peninsula. The inland group remains to be considered here.[1]

While it seems likely that some or all of the Lower Californian mountain Helices will prove to belong to the section *Eremarionta* of the genus *Micrarionta*, yet none are known anatomically, and we have as yet no way to tell them by the shells alone from *Sonorella*. It seems best therefore to refer all *Sonorella*-like shells of the Southwest to that genus until they are proved to belong elsewhere by dissection of the animal.

### *Group of Sonorella lohrii.*

Helices of this group are much depressed, with a broadly open umbilicus, more or less overhung by the dilated columellar lip. They have the color and texture of *Sonorella*.

[1] In the paper just mentioned, I ranked *Helix canescens* Adams and Reeve as a subspecies of *Micrarionta veatchii* (p. 386). This was of course an oversight, since *H. canescens* was described first. It will probably be best to leave both stand as species until their intergradation is demonstrated; but if they *do* intergrade, then *veatchii* will take the trinomial.

Sonorella lohrii (Gabb). Pl. 2, fig. 8.

*Helix lohrii* Gabb. American Journal of Conchology, III, p. 236, pl. 16, fig. 2 (1867) ; IV, p. 235 (1868).

*Sonorella lohrii* Gabb, Pilsbry, Proc. A. N. S. Phila. 1900, p. 560 (1901). Bartsch, Smiths. Misc. Coll., vol. 47, p. 197, pl. 32, fig. 1 (1904).

*Helix steganella* Mabille, 1895. See below.

The prominent features of this species are the very minutely granulated surface, the large nuclear whorl and small number of whorls, the position of the periphery, which is above the middle, very obtusely angular in front, the surface below it being rather flattened and sloping inward. The peristome is somewhat bell-shaped, flaring, reflexed outwardly and below. The type (No. 58106 A. N. S. P.) measures, height 10, diam. 22.1 mm. ; width of umbilicus 4 mm. ; width of aperture 13, height 11.1 mm.

Dr. Bartsch has given excellent figures of this species, but for ready comparison with the others I have figured the type specimen here.

*S. lohrii* comes "from the higher table lands near Moleje."

Sonorella lioderma Pilsbry. Pl. 2, fig. 7.

*Sonorella lohrii lioderma* Pils., Nautilus XVIII, p. 59 (1904).

The shell is depressed with very low spire and broadly open umbilicus, contained about five times in the diameter of the shell ; very glossy, smooth except for fine growth-lines ; whorls $4\frac{1}{2}$, convex, slowly increasing to the last which widens rapidly, is rounded at the periphery, and descends rather deeply in front. The aperture is strongly oblique, transversely ovate. Peristome expanded and reflexed throughout, the margins strongly converging and joined by a thin, short parietal callous, the columellar margin dilated, overhanging a small part of the umbilicus. Height 10, diam. 21.8 mm. ; width of umbilicus 4.2 mm. ; aperture 13.3 mm. wide, 11.1 high (including peristome).

This shell was originally described as a subspecies of *S. lohrii*, but it is evidently distinct. It differs by the entire absence of granulation, the equally rounded periphery, less deeply im-

pressed suture, by having a much smaller embryonic whorl, a more transversely lengthened aperture with shorter parietal callus; and by the more arched and more reflexed upper margin of the peristome. As the original description was rather brief and unillustrated, figures of the type are now given.

*S. lioderma* was collected by Gabb. It was one of the specimens formerly in the tray with his type of *H. lohrii*, and presumably was found in the same district. The type is No. 58107 A. N. S. P. I cannot identify it with any of the species described by Mabille.

The following species evidently belong to the group of *S. lohrii*, since all are described as "*broadly and perviously umbilicate*". Their other chief characters are given below, abbreviated from Mabille's descriptions, as the original publication is probably not accessible to many West Coast conchologists. None of them were figured, and no comparisons with other species are given.

*Helix indigena* J. Mabille. Depressed-subdiscoidal, solid, subpellucid, somewhat glossy, above planulate, reddish-corneous with a brown zone bordered by white zones, white beneath; beautifully rib-striate; apex obtuse, minute, striate; whorls 5, the last rounded, descending a little to the aperture; base a little inflated, especially around the umbilicus. Peristome a little dilated, scarcely reflexed, the margins converging, joined by a scarcely noticeable callus. Diam. 19 to 21, alt. 7 to 8 mm. Only found above 800 meters on the peaks of the Sierra, throughout most of the central part of the Peninsula of California (Bulletin de la Société Philomathique de Paris, 8th Ser., vii, 1895, p. 64).

This seems from the description to be a distinct species, differing from *S. lioderma* by the sculpture and the less developed peristome.

*Helix steganella* J. Mabille. Depressed, destitute of color and cuticle but with a reddish zone, rather thick, solid; irregularly striate, and densely covered with many minute granules arranged in oblique series. Spire slightly prominent, the apex costulate, obtuse. Whorls 4, the last strongly dilated and shortly descending at the aperture, a little excavated above at the suture, obscurely angular at the periphery, slopingly compressed below the periphery, inflated around the umbilicus. Peristome thickened, spreading, a little reflexed, the converging margins joined

by a very thin callus ; the outer margin at first rather straight, scarcely reflexed, then carved, basal margin nearly straight, reflexed. Umbilical margin dilated, thickened, slightly covering the umbilicus. Diam. 21 to 29, alt. 7½ to 8 mm. Same localities (Same reference).

The description of this species applies very well to *H. lohrii* Gabb. I think it a synonym of that species.

*Helix invecta* J. Mabille. Depressed-orbiculate, without cuticle or color, but with traces of a brownish line above ; solid, rather thick, coarsely striatulate and under a lens beautifully striatulate. Whorls 4, the last angular at periphery, rather swollen below, at the aperture dilated and slightly descending. Peristome expanded, slightly thickened, the approaching margins joined by a rather thick callus ; columellar margin dilated in a triangular plate over the umbilicus. Diam. 21, alt. 7 mm. Lower California (same reference, p. 65).

Seems nearer *S. lohrii* than any other species I have seen.

*Helix digueti* J. Mabille. Subdepressed, without color or cuticle, solid, subopaque, irregularly and densely costulate-striate, apex nearly smooth, whorls 4, the last slightly dilated and shortly descending to the aperture. Peristome reflexed, margins joined by a very thin callous, columellar margin dilated, nearly covering the umbilicus. Diam. 20 to 20½, alt. 8 to 9 mm. No locality mentioned (same reference, p. 65).

I have seen no species answering to the description of this.

*Group of S. hachitana.*

Sonorella merrilli Bartsch (1904). Below San Quentin, L. Cal.

The surface has "very dense, exceedingly minute granulations, both on the upper and the lower surface." Height 12.5, diam. 22, umbilicus about 4 mm.

Sonorella peninsularis n. sp. Pl. 2, figs. 4.

The shell is umbilicate (the width of umbilicus contained between eight and nine times in the diameter of the shell), moderately depressed, the spire low-conic ; pale cinnamon with a few white streaks, having a chestnut-brown band above the periphery, margined narrowly with whitish above, more widely below ; whitish around the umbilicus. The surface is glossy, lightly marked with growth-lines, and in some places above the

periphery of the last whorl some excessively faint spiral lines may be seen under a hand-lens. The first whorl begins with irregular radial ripples, then is very minutely rugose with inconspicuous rounded papillæ, widely spaced, and arranged in forwardly descending, curved series. Whorls 5, rather convex, those of the spire rather narrowly coiled, the last rapidly enlarging, descending somewhat to the aperture. The aperture is large and decidedly oblique. The peristome is thin, the upper and outer margins narrowly expanding, basal margin narrowly reflexed ; the columellar margin runs rather far forward, and is much dilated at the insertion, the external edge straightened.

Height 15, diam. 22 mm. ; umbilicus 2.6 mm.

*Locality.*— Trinidad, on the west coast, near San Borga. Wm. M. Gabb. Type no. 58127 A. N. S. P.

I have not been able to locate Trinidad on the map. San Borgia is a mission in the interior, below the 29th parallel. There are several other specimens in the collection, all taken by Gabb.

This is one of several forms which W. M. Gabb determined as *Helix carpenteri* Newc.—a Californian species which differs by its "numerous very minute spiral striations". *Sonorella merrilli* Bartsch is more depressed, with a smaller aperture and larger umbilicus. The several species described from the peninsula by M. Jules Mabille differ in proportions from this one.

Sonorella ultima n. sp. Pl. 2, fig. 5.

The shell is narrowly umbilicate (the width of the umbilicus contained about twelve times in the diameter of shell); rather thin ; depressed-globose, with very low conic spire ; pale cinnamon, fading to opaque white on the base, having a chestnut-brown band above the periphery. The surface is glossy, weakly marked with growth-lines, without spiral striation. Whorls $4\frac{1}{2}$, moderately convex, those of the spire slowly increasing, the last whorl very wide, deflexed in front. The aperture is large, oblique. Peristome thin at the edge, but having a rather wide low white callous rim within, the terminations strongly converging ; the upper margin is unexpanded, outer and basal margins narrowly expanded ; columellar margin carried forward, straight-

ened outwardly, broadly dilated at the insertion, partly covering the umbilicus ; parietal film transparent but not very thin.

Height 12.7, diam. 20 mm. Aperture with peristome 12.7 mm. wide ; umbilicus 1.7 mm. wide.

*Locality.*—Sinaloa, Mexico, Wm. M. Gabb. Type No. 58124 A. N. S. P.

The special features of this species are its narrow umbilicus, very wide last whorl, large aperture and surface free from any trace of spiral incised lines. The apex is slightly worn, but I think I see traces of the same sculpture described for the first whorl of *S. peninsularis.* It is one of the specimens Gabb identified as *Helix rémondi* Tryon—which is quite a different thing. Gabb was a really notable geological explorer, but sometimes he was not fussy over identifications of shells.

Epiphragmophora ellipsostoma Pilsbry. Pl. 2, figs. 6.

Described in Nautilus VIII, p. 81 (1894), but not figured before. The locality given by Gabb, San Juan del Norte, is rather ambiguous. It would be taken for the place so named in Nicaragua were it not that the specimen was stuck on a label with a shell of *Sonorella peninsularis*, suggesting a Lower Californian habitat. The malleation and epidermis recall Californian and Peruvian Helices, but no similar species has been taken in Nicaragua. The figures represent the type-specimen, no. 10745 A. N. S. P.

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## OBSERVATIONS ON THE UNIO COR, OF CONRAD.

BY L. S. FRIERSON.

T. A. Conrad published in 1834, his "New Fresh Water Shells" describing and figuring a number of species. His figures were not very good, and some confusion ever since has been the result. For instance, his figure of *U. prasinus* is so unlike the fignre given by Dr. Lea for his *U. schoolcrafti* that the two have been placed as different sub-species in our lists ; yet both figures were drawn from the same identical specimen ! Mr. Conrad figured a shell, (presumably his *Unio stramineus*) on plate 7, but he omitted it altogether from the text !